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# Custom Log

**COMPANY** Encana Oil and Gas (USA)  
**WELL** Stewart 36-1H  
**FIELD** Plateau  
**REGION** Piceance Basin  
**COORDINATES** N 39 13' 34.900"  
W 108 3' 37.150"  
**ELEVATION** 5964' GL  
5986' KB  
**COUNTY, STATE** Mesa, Colorado  
**API INDEX** 05-077-10100-00  
**SPUD DATE** 04/15/2011  
**CONTRACTOR** Nabors Drilling  
**CO. REP.** Charlie Brown  
**RIG/TYPE** M13 Rotary Triple/ Top Drive  
**LOGGING UNIT** ML 0035  
**GEOLOGISTS** Jim Sadler  
Phillip Kelley-Dotson  
**ADD. PERSONS**  
**CO. GEOLOGIST** Erik Graven

## LOG INTERVAL

## CASING DATA

**DEPTHS:** 3400' TO 13202'  
**DATES:** 04/19/2011 TO 05/15/2011  
**SCALE:** 1"=100'

20" AT 40'  
10.75" AT 1427'  
7.625" AT 6558'  
4.5" AT

## MUD TYPES

## HOLE SIZE

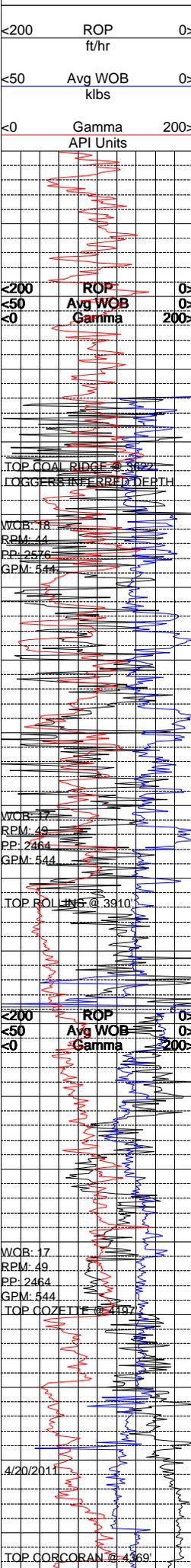
Water Based TO 13202'  
TO  
TO  
TO

24" TO 40'  
12.25" TO 1457'  
9.875" TO 6580'  
6.5" TO 13202'

## ABBREVIATIONS

<i>NB</i> NEWBIT	<i>PV</i> PLASTIC VISCOSITY	<i>LC</i> LOST CIRCULATION
<i>RRB</i> RERUN BIT	<i>YP</i> YIELD POINT	<i>CO</i> CIRCULATE OUT
<i>CB</i> CORE BIT	<i>FL</i> FLUID LOSS	<i>NR</i> NO RETURNS
<i>WOB</i> WEIGHT ON BIT	<i>CL</i> PPM CLORIDE ION	<i>TG</i> TRIP GAS
<i>RPM</i> ROTARY REV/MIN	<i>Rm</i> MUD RESISTIVITY	<i>SG</i> SURVEY GAS
<i>PP</i> PUMP PRESSURE	<i>Rmf</i> FILTRATE RESISTIVITY	<i>WG</i> WIPER GAS
<i>SPM</i> STROKES/MIN	<i>PR</i> POOR RETURNS	<i>CG</i> CONNECTION GAS
<i>MW</i> MUD WEIGHT	<i>LAT</i> LOGGED AFTER TRIP	
<i>VIS</i> FUNNEL VISCOSITY	<i>LAS</i> LOGGED AFTER SURVEY	

ALTERED ZONE	CHERT - GLASSY	FELSIC SILIC DIKE	MARL - CALC	SANDSTONE
ANDESITE	CHERT - PORCEL	FOSSIL	METAMORPHICS	SANDSTONE-TUFFACEOUS
ANHYDRITE	CHERT - TIGER STRIPE	GABBRO	MUDSTONE	SERICITIZATION
BASALT	CHERT - UNDIFF	GLASSY TUFF	OBSIDIAN	SERPENTINE
BENTONITE	CLAY	GRANITE	PALEOSOL	SHALE
BIOTITIZATION	CLAY-MUDSTONE	GRANITE WASH	PHOSPHATE	SHALE TUFFACEOUS
BRECCIA	CLYST-TUFFACEOUS	GRANODIORITE	PORCELANITE	SHELL FRAGMENTS
CALCARENITE	CHLORITIZATION	GYPSUM	PORCELANEOUS CLYST	SIDERITE
CALCAREOUS TUFF	COAL	HALITE	PYRITE	SILICIFICATION
CALCILUTITE	CONGLOMERATE	HORNBL-QTZ-DIO	PYROCLASTICS	SILTSTONE
CARBONATES	CONGL. SAND	IGNEOUS (ACIDIC)	QUARTZ DIORITE	SILTST-TUFFACEOUS
CARBONACEOUS MAT	CONGL. SANDSTONE	IGNEOUS (BASIC)	QUARTZ LATITE	TUFF
CARBONACEOUS SH	COQUINA	INTRUSIVES	QUARTZ MONZONITE	VOLCANICLASTICS SEDS
CEMENT CONTAM.	DACITE	KAOLINIC	RECRYSTALLIZED CALCITE	VOLCANICS
CHALK	DIATOMITE	LIMESTONE	RHYOLITE	
CRYSTALLINE TUFF	DIORITE	LITHIC TUFF	SALT	
CHERT - ARGILL	DOLOSTONE	MARL - DOLO	SAND	



**Depth**

3500

3600

3700

3800

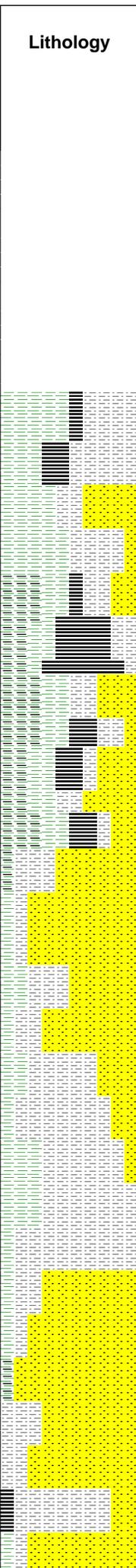
3900

4000

4100

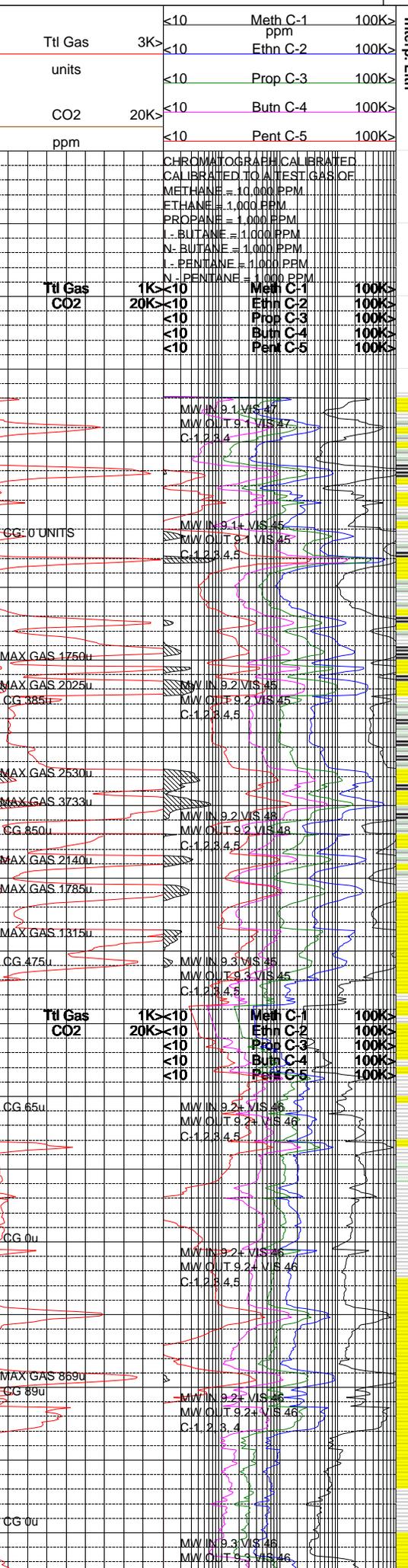
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4300



**Lithology**

**Slide**



**Interp. Lith**

**Remarks**

**Survey Data, Mud Reports, Other Info.**

FOR MUDLOGGING PROCEDURES.

ROCK COLORS ARE BASED ON THE GSA ROCK COLOR CHART.

GAS EQUIPMENT IS CALIBRATED TO READ 500 UNITS = 10% METHANE IN AIR.

CONNECTION AND WIPER GAS IS REPORTED IN UNITS ABOVE BACKGROUND GAS.

LOGGING COMMENCED AT 0200HRS ON 4/19/2011 AT 3600' MD.

SHALE @ 3600' MD = DARK GRAY, BROWNISH BROWN, TO LIGHT BLACK; DENSE TO CRUNCHY ORANGE, TO DARK BROWN; TOUGH TO CRUNCHY MASSIVE TO PLATY CUTTINGS HABIT; DULL TENACITY; IRREGULAR TO PLATY FRACTURE; SILTY TEXTURE; INTERBEDDED SILTSTONE AND MASSIVE TO PLATY CUTTINGS HABIT; DULL LAMINAE TO THIN STRUCTURE.

EARTHY LUSTER; CLAYEY GRADING TO SILTY TEXTURE; THIN TO THICK STRUCTURE.

COAL @ 3630' MD = DARK GRAY TO BLACK; BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; PLATY TO MASSIVE CUTTINGS HABIT; DULL EARTHY LUSTER; SMOOTH TO CLAYEY TEXTURE; LAMINAE TO THIN STRUCTURE.

SANDSTONE @3750'= GRAY TO DIRTY BROWN YELLOW COLOR; MEDIUM GRAINED; MOD SORTING; MOD ANGULAR TO MOD WELL RND'D FRIABLE TO OCC HARD; LITHIC RICH WITH OCC ABUND BLACK REWORKED COAL AND CARBONACEOUS MATERIAL; MOD VISIBLE POROSITY; MOD TO HIGH GAS TO 3600 UNITS ESPECIALLY WHEN ASSOCIATED WITH COAL SEAMS; NO APPARENT OIL INDICATORS; MOD WET GAS.

CARBONACEOUS SHALE @ 3850'= VERY DARK BROWNISH GRAY TO BLACK; FIRM AND BRITTLE; FISSIL; THIN PLATY TO TABULAR CUTTING HABIT; SMOOTH TO MOD SILTY TEXTURE; GRADES TO CARBONACEOUS SILTSTONE; VARIABLE FROM ARGILLACEOUS TRUE SHALE TO NEAR COAL; COMMON VERY THIN COAL LAMINAE AND SEAMS; NO OIL AND MODERATE GAS THRU SECTION

ROLLINS SANDSTONE= LIGHT GRAY WHITE TO BUFF TAN; HARD AND WELL CEMENTED; FINE TO LOWER MEDIUM GRAINED; MOD WELL SORTED; CLEAN APPEARANCE AND VERY QUARTZOSE; CALCITE CEMENT; MOW VISIBLE POROSITY DUE TO CEMENTATION; NO APPARENT FRACTURES; MOD LOW GAS SHOW FROM ROLLINS; POSSIBLY WATER WET.

SILTSTONE @ 4080'= BUFF TAN TO YELLOWISH BROWN; VERY FIRM TO HARD; DENSE AND TOUGH; SILTY TO FINE ABRASIVE TEXTURE AS GADS TO VERY FINE SANDSTONE; DULL LUSTER; THIN TO THICK STRUCTURE; INTERBEDDED WITHIN SHALE.

SILTSTONE @ 4110' = DARK BROWNISH ORANGE TO LIGHT GRAYISH BLACK; TOUGH TO CRUNCHY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; CLAYEY GRADING TO GRITTY TEXTURE; THIN TO THICK STRUCTURE; INTERBEDDED SHALE SEEN IN SAMPLE.

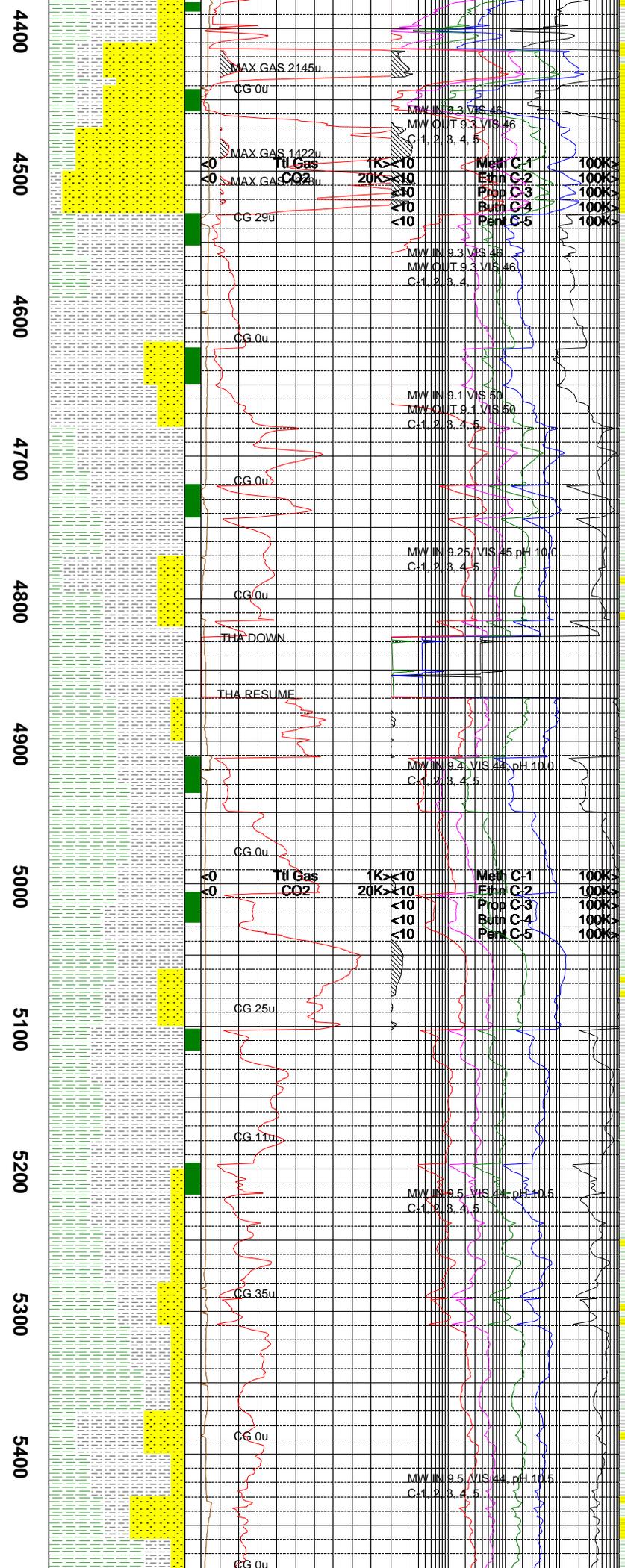
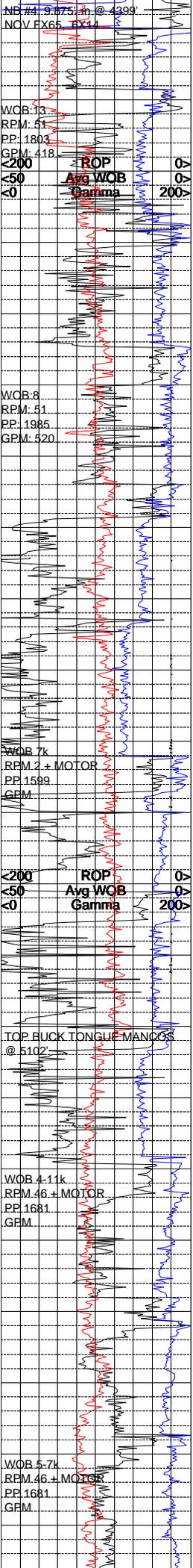
COZZETTE SANDSTONE = LIGHT GRAY, BLUISH WHITE, TO DARK BROWNISH GRAY; QUARTZ FRAMEWORK; FINE TO MEDIUM GRAIN SIZE; WELL TO FAIR SORTING; SUBROUND TO ROUNDED ANGULARITY; HIGH TO MODERATE SPHERICITY; FROSTED TO ETCHED SURFACE FEATURES; INTERBEDDED CARBONACEOUS MATERIAL SEEN IN SAMPLE; VERY WELL CEMENTED, HARD.

SANDSTONE @ 4280' = BLUISH WHITE, DARK GRAY, TO BLACK; FINE TO MEDIUM GRAIN SIZE; WELL TO FAIR SORTING; SUBROUNDED TO ROUNDED ANGULARITY; HIGH TO MODERATE SPHERICITY; FROSTED SURFACE FEATURE; DARK MICA MATERIAL SEEN IN SAMPLE; INTERBEDDED WITHIN SILTSTONE; NO VISIBLE OUT GASSING.

SILTSTONE @ 4380' = DARK GRAY, GRAYISH

4/20/2011

TOP CORCORAN @ 4369'



RED PURPLE TO BROWNISH BLACK; TOUGH TO CRUNCHY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; SILTY GRADING TO GRITTY TEXTURE; THIN TO THICK STRUCTURE; SOME INTERBEDDED SAND IN SAMPLE.

SANDSTONE @ 4460' = BLUISH WHITE, GRAYISH WHITE; SALT AND PEPPER APPEARANCE; PREDOMINANTLY QUARTZ FRAMEWORK; DARK MICA MATERIAL PRESENT; FINE TO MEDIUM GRAIN SIZE; FAIR TO POOR SORTING; SUBROUNDED TO SUBANGULAR; MODERATE TO LOW SPHERICITY; FROSTED AND ETCH SURFACE FEATURES; QUARTZ WITH TRACE CALCITE CEMENT.

SILTSTONE @ 4560' = DARK GRAY, GRAYISH RED PURPLE TO BROWNISH BLACK; TOUGH TO CRUNCHY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; SILTY GRADING TO GRITTY TEXTURE; THIN TO THICK STRUCTURE.

SILTSTONE @ 4630' = DARK GRAY, BROWNISH BLACK; TOUGH, CRUNCHY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY GRADING TO GRITTY TEXTURE; THIN TO THICK STRUCTURE.

SILTSTONE @ 4700' = DARK GRAY, BROWNISH BLACK; TOUGH, CRUNCHY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY GRADING TO GRITTY TEXTURE; GRADING FROM SHALE TO A VERY FINE CLAYEY SANDSTONE; MODERATE DRILL GAS THRU SECTION.

SHALE = MEDIUM TO DARK GRAY TO MEDIUM BROWN GRAY; VERY FIRM AND BRITTLE; SLI CRUNCHY; NON TO SLI CALCAREOUS; POSS SLI SILICIC PER CRUNCHY NATURE; THINLY BEDDED AND MOD FISSIL; INTERBEDDED THINLY WITH SILTSTONES; OCC SMALL BLACK TO VERY DARK BROWN FOSSIL FRAGMENTS; NO OIL INDICATORS; MODERATE DRILL GAS WITH C-1 THRU C-5 PRESENT.

SILTSTONE = MEDIUM TO DARK GRAY TO BROWN GRAY; VERY FIRM TO MOD HARD; SILTY TO FINE ABRASIVE TEXTURE; BRITTLE TO TO CRUNCHY; SMALL BLOCKY TO TABULAR CUTTING HABIT; NON TO SLI CALCAREOUS; DULL TO SLI RESINOUS LUSTER; HACKLY TO PLANAR FRACTURE; GRADING TO VERY FINE DENSE CLAYEY SANDSTONE IN PART; NO FRACTURE EVIDENCE; VARIABLE FISSIL; NO OIL INDICATORS; MODERATE GAS THRU SECTION.

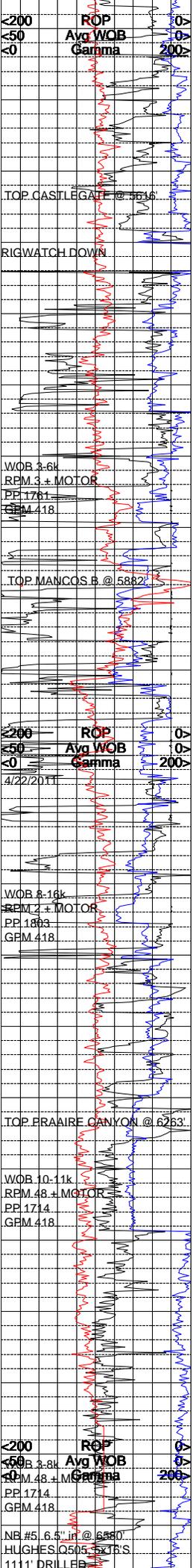
SANDSTONE = VERY FINE GRAINED; BROWNISH GRAY COLOR; DENSE AND VERY WELL CEMENTED WITH NO TO VERY SMALL VISIBLE POROSITY NO APPARENT FRACTURES; QUARTZOSE; MOD WELL ROUNDED; SILICA CEMENT; MOD SORTED; THIN BEDS WITHIN SHALE/SILT SECTION; GRADING TO AND FROM SILTSTONE; HARD AND WELL CEMENTED; NO OIL INDICATOR MINOW INCREASE IN GAS COMPARED TO REST OF SECTION FROM SANDSTONES.

SHALE @ 5200' = MEDIUM GRAY WITH BROWN HUES; FIRM TO SLI HARD; INCREASINGLY ARGILLACEOUS AND LESS CRUNCHY; SLI SOLUBLE ON WATER WASH GIVING CLOUDY WATER NON CALCAREOUS; THIN PLATY CUTTINGS; FISSIL; THINLY BEDDED TO LAMINATED; COMMON SHALE PARTINGS; GRADES TO SILTSTONE IN PART; DULL EARTHY LUSTER; DRIES TO LIGHT GRAY BUFF COLOR; MODERATE ROP DEPENDENT DRILL GAS; NO OIL INDICATORS.

SANDSTONE @ 5310' = WHITE TO LIGHT GRAY; LOWER MEDIUM GRAINED; WELL SORTED; FRIABLE TO SLI HARD; GRAIN SUPPORTED; VERY QUARTZOSE; MODERATE TO LOW VISIBLE POROSITY; SILICA AND CALC CEMENT; DULL TO MOD YELLOW FLUORESCENCE; NO CUT NOR PETRO ODOR; MODERATE GAS THRU SECTION SANDSTONES ARE THIN BEDS WITHIN SHALE SECTION.

NOTE = GAS READINGS ARE PRIMARILY DRILL GAS AND ARE HIGHLY ROP DEPENDANT; VERY SMALL TO ABSENT CONNECTION GASSES SHOW VERY LITTLE TO NO GAS BLEED IN WHILE PUMPS OFF;

SHALE @ 5430' = MEDIUM GRAY WITH MINOR BROWN HUES; FIRM TO OCC HARD; DULL TO MOD RESINOUS LUSTER; SMOOTH CLAYEY TO OCC SILTY TEXTURE; CRUMBLY; FISSIL WITH THIN PLATY TO SCALY CUTTINGS DOMINANT; SLIGHTLY CALCAREOUS; CLAYS SLI SOLUBLE ON WATER WASHING; GRADES TO SILTSTONE;



5500

5600

5700

5800

5900

6000

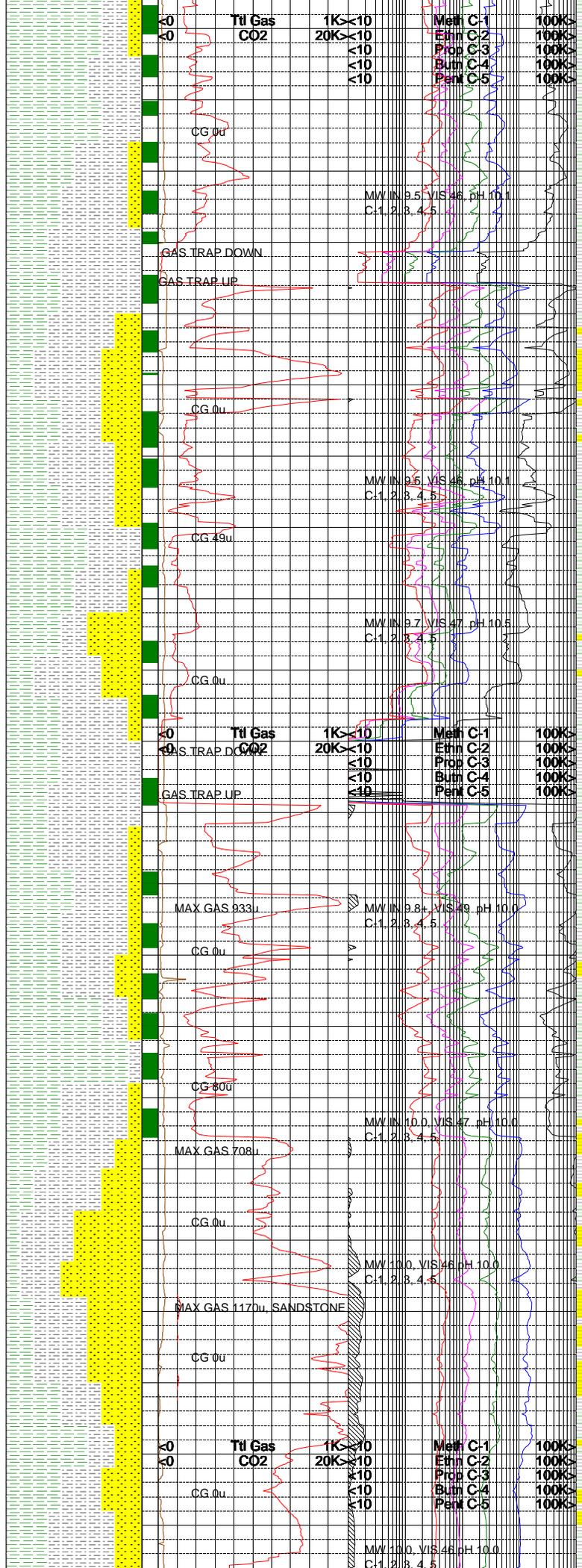
6100

6200

6300

6400

6500



THICK SECTION OD SILTSTONE AND SHALE;  
 MODERATE FAIRLY CONSISTENT DRILL GAS  
 THRU SECTION; NO OIL INDICATORS.

SILTSTONE @ 5580' = MEDIUM TO LIGHT GRAY;  
 HARD; SILTY TO SLI ABRASIVE TEXTURE;  
 BLOCKY TO TABULAR CUTTING HABIT; COMMON  
 CLAY PARTINGS; SLI CALCAREOUS; DULL TO  
 SLI SPARKLING LUSTER; TOUGH TO CRUNCHY;  
 grading OCCASIONALLY TO VERY FINE  
 SANDSTONE WITH A GRITTY TEXTURE AND  
 VISIBLE WELL ROUNDED QUARTZ GRAINS;  
 NO OIL INDICATORS AND A STEADY DRILL  
 GAS THRU SECTION

SHALE @ 5640' = MEDIUM GRAY, TO LIGHT  
 GRAY; TOUGH TO CRUNCHY TENACITY;  
 INTERBEDDED SILT AND QUARTZ GRAINS  
 PRESENT; IRREGULAR TO PLANAR FRACTURE;  
 PLATY TO FLAKY CUTTINGS HABIT; DULL  
 EARTHY LUSTER; CLAYEY GRADING GRITTY  
 TEXTURE; LAMINAE TO THIN STRUCTURE; NO  
 VISIBLE HYDROCARBON INDICATORS.

SILTSTONE 5730' = DARK GRAY, TO GRAYISH  
 BLACK; TOUGH, ABRASIVE CRUNCHY  
 TENACITY; IRREGULAR TO BLOCKY FRACTURE;  
 MASSIVE CUTTINGS HABIT; DULL EARTHY  
 LUSTER; SILTY GRADING TO GRITTY TEXTURE;  
 INTERBEDDED CRYSTALS OF QUARTZ;  
 THIN TO THICK STRUCTURE.

SILTSTONE @ 5810' = DARK GRAY, BROWNISH  
 BLACK; TOUGH, CRUNCHY TENACITY;  
 IRREGULAR TO BLOCKY FRACTURE; MASSIVE  
 TO PLATY CUTTINGS HABIT; DULL EARTHY  
 LUSTER; SILTY GRADING TO GRITTY TEXTURE;  
 THIN TO THICK STRUCTURE; GRADING FROM  
 SHALE TO A VERY FINE CLAYEY SANDSTONE;  
 MODERATE DRILL GAS THRU SECTION.

SHALE @ 5900' = DARK GRAY, TO BROWNISH  
 BLACK; TOUGH, CRUNCHY TENACITY;  
 IRREGULAR TO PLANAR FRACTURE; PLATY  
 TO FLAKY CUTTINGS HABIT; DULL EARTHY  
 LUSTER; CLAYEY GRADING TO GRITTY  
 TEXTURE; LAMINAE TO THIN STRUCTURE;  
 MOSTLY INTERBEDDED WITHIN SILTSTONE.

NOTE= SHAKER WITH GAS TRAP MALFUNCTION  
 MOVED GAS TRAP TO NEW SHAKER, GAS OFF  
 LINE FOR A WHILE.

SILTSTONE @ 6050' = MEDIUM TO OCC DARK  
 GRAY; FAIRLY EVEN COLORED; MOD HARD TO  
 HARD; NON CALCAREOUS TO POSSIBLY  
 SILICEOUS; DENSE AND TOUGH; SILTY TO  
 FINE ABRASIVE TO GRITTY TEXTURE WHEN  
 GRADING TO SANDY SILTSTONE; BLOCKY  
 CUTTING HABIT; MODERATE TO INCREASING  
 DRILL GAS; GAS MAGNITUDE TIRED TO ROP  
 NO CONNECTION GASSES OF NOTE.

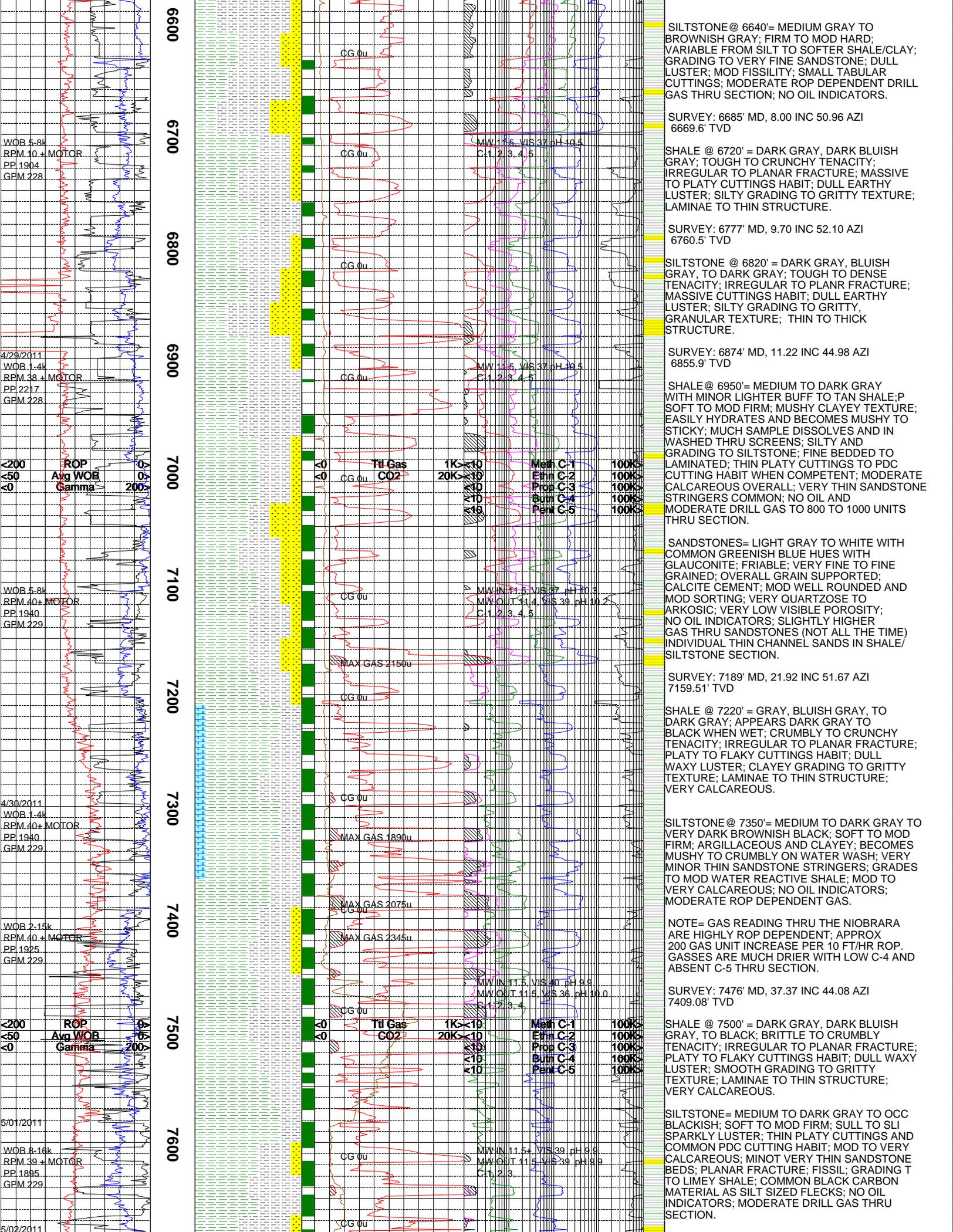
SHALE @ 6200' = MEDIUM GRAY TO SLI BROWN  
 GRAY; FIRM AND BRITTLE IN PART AND OCC  
 SOFT AND DUCTILE WHEN VERY CLAYEY;  
 SLI SOLUBLE ON WASH; THIN PLATY TO  
 SCALY CUTTINGS; MOD TO GOOD FISSILITY;  
 THINLY BEDDED AND INTERBEDDED WITH  
 SILTSTONE; RESINOUS TO SLI SPARKLY  
 LUSTER WITH OCC ABUNDANT MICA AND MINOR  
 PYRITE; OCC BLACK CARBONACEOUS MATERIAL  
 OR FOSSIL RUMINANTS; NO OIL INDICATORS;  
 MODERATE DRILL GAS SHOWS THRU SECTION.

SANDSTONE @ 6360' = LIGHT GRAY WHITE TO  
 DARK GRAY WITH COMMON BLACK MATERIAL  
 STREAKS; VERY FINE TO FINE GRAINED; MOD  
 WELL SORTED; FRIABLE TO WELL CEMENTED  
 AND HARD; MOD WELL ROUNDED MODERATE  
 SPHERICITY; GRAIN SUPPORTED; GRADES TO  
 SANDY SILTSTONE; THINLY TO THICKLY  
 BEDDED; MODERATE TO GOOD GAS SHOW  
 TO OVER 1000 UNITS DESPITE INCREASED  
 MUD WEIGHT TO 10.0 PPG; MOD WET GAS  
 WITH C-1 THRU C-5 IN CHROMATOGRAPHY.

SILTSTONE @ 6450' = MEDIUM TO DARK GRAY;  
 VERY FIRM TO MOD HARD; DULL TO SPARKLY  
 LUSTER; INTERBEDDED WITH SHALE AND  
 VERY FINE SANDSTONES; FISSIL; OCC ABUND  
 MICAS; VARIABLE FROM CLAY RICH TO SANDY;  
 SLI CRUNCHY; MOD CALCAREOUS; NO FRACTURE  
 EVIDENCE; MODERATE TO OCC HIGH DRILL GAS

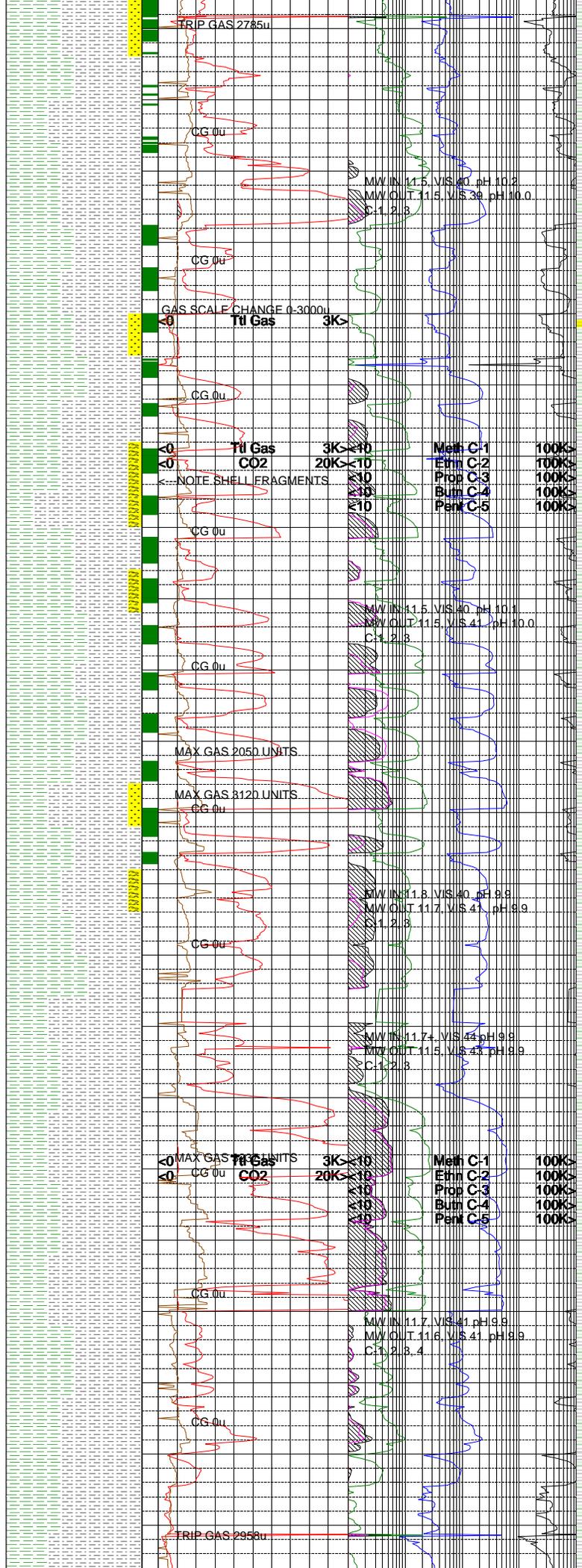
SHALE = DARK GRAY TO SLI BLACKISH; FIRM A  
 BRITTLE; FISSIL; THIN PLATY CUTTINGS;  
 DULL TO RESINOUS LUSTER; THINLY BEDDED  
 WITH SILTSTONES; MOD CALCAREOUS;  
 NO APPARENT FRACTURES; MODERATE DRILL  
 GAS THRU SECTION; INCREASING CALCAREOUS  
 THRU THE PRAIRIE CANYON MEMBER; NO  
 OIL INDICATES

TD INTERMEDIATE SECTION @ 6580' ON  
 04/22/2011 @ 16:00 HRS

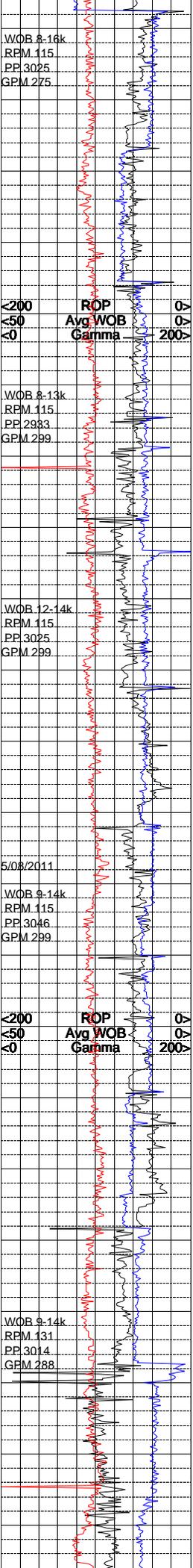


NB #6, 6.5" in @ 7691'  
 REED/RSF613M  
 WOB 15-20k  
 RPM 39 + MOTOR  
 PP 2237  
 GFM 229  
 5/03/2011  
 <200 ROP  
 <50 Avg WOB  
 <0 Gamma  
 WOB 6-16k  
 ROM 39 + MOTOR  
 PP 1988  
 GFM 229  
 WOB 6-9k  
 ROM 40 + MOTOR  
 PP 2366  
 GFM 229  
 5/04/2011  
 NB #7, 6.5" in @ 8414  
 SMITH/MD1516  
 <200 ROP  
 <50 Avg WOB  
 <0 Gamma  
 WOB 7-8k  
 ROM 151  
 PP 2497  
 GFM 280  
 5/06/2011, 5/07/2011  
 NB #8, 8.5" in @ 8758  
 REED/RSF613M

7700  
 7800  
 7900  
 8000  
 8100  
 8200  
 8300  
 8400  
 8500  
 8600  
 8700



SURVEY: 7677' MD, 46.41 INC 48.07 AZI  
 7526.62' TVD  
 SHALE= MEDIUM TO OCC DARK GRAY; SOFT TO SLI FIRM; DULL TO SLI SPARKLY RESINOUS LUSTER; SILTY AND GRADING TO SILTSTONE IN PART; LAMINATED WITH SILTSTONE; EASILY HYDRATED AND SOLUBLE IN WATER AND EASILY WASHES THRU SCREEN ON WATER WASH; MODERATELY CALCAREOUS; THIN PLATY CUTTINGS; FISSIL; NO OIL COMMON CARBONACEOUS MATERIAL FLECKS; NO OIL AND MODERATE ROP DEPENDENT DRILL GAS THRU SECTION.  
 SURVEY: 7854' MD, 62.21 INC 46.95 AZI  
 7653.91' TVD  
 SHALE @ 7870' = DARK GRAY, DUSKY BLUE, WITH BLACK HUES; CRUMBLY TO CRUNCHY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY GRADING TO GRITTY TEXTURE; LAMINAE STRUCTURE WITH INTERBEDDED CARBONACEOUS MATERIAL; MODERATELY CALCAREOUS.  
 SILTSTONE @ 8000' = MEDIUM TO VERY DARK GRAY TO BLACKISH; FIRM; SILTY TO SLI GRITTY TEXTURE; BUMPY SPECKLED APPEAR UNDER HIGH MAGNIFICATION; SMALL BLACK SPECKS COMMON; CALCAREOUS; OCC THIN CALCITE VEINLETS; SCATTERED SHELL FRAGMENTS; SLI TO MOD SOLUBLE ON WASHING WHEN CLAY RICH; GRADING TO FISSIL SHALE; NO OIL INDICATORS; 1200 TO 2000 UNITS OF DRILL GAS CONTINUES; GAS IS VERY DRY.  
 SURVEY: 8108' MD, 79.93 INC 49.31 AZI  
 7739.15' TVD  
 SHALE @ 8120' = MEDIUM TO DARK GRAY, BLUISH GRAY, TO DARK BROWN; CRUMBLY TO BRITTLE TENACITY; IRREGULAR TO PLANAR FRACTURE; PLATY TO FLAKY CUTTINGS HABIT; DULL EARTHY LUSTER; CLAYEY GRADING TO GRITTY TEXTURE; INTERBEDDED WITHIN SILTSTONE; LAMINAE TO THIN STRUCTURE; FLECKS OF CARBONACEOUS MATERIAL; ROP DEPENDENT THRU SECTION.  
 SURVEY: 8235' MD, 87.91 INC 47.64 AZI  
 7752.48' TVD  
 SILTSTONE @ 8250' = DARK GRAY, GRAY, TO BLACK; CRUMBLY TO CRUNCHY TENACITY; IRREGULAR, BLOCKY FOR PLANAR FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY GRADING TO SUCROSIK TEXTURE; SOME INTERBEDDED CARBONACEOUS MATERIAL; INTERBEDDED SHELL FRAGMENTS OF MARL; LAMINAE TO THICK STRUCTURE; GAS IS SOMEWHAT DRY.  
 SURVEY: 8359' MD, 92.80 INC 47.93 AZI  
 7749.59' TVD  
 NOTE= POOH @ 8415' TO PICK UP POWER DRIVE AND NEW BHA ASSEMBLY  
 SILTSTONE @ 8450' = DARK BROWNISH GRAY TO OCC LIGHTER BROWN; FIRM TO OCC VERY FIRM; RESENOUS SPARKLY LUSTER; SILTY TO SLI ABRASIVE TEXTURE; FINE PELLETAL STRUCTURE NOTED IN CUTTINGS; GRADING TO SOFT SHALE; FINELY INTERBEDDED WITH SHALE; PLATY AND PROBABLY FISSIL NATURE; NO OIL INDICATORS; MOD TO HIGH DRILL GAS TO 3200 UNITS WHILE DRILLING; NO CONNECTION GASSES.  
 SURVEY: 8561' MD, 90.24 INC 46.55 AZI  
 7742.63' TVD  
 SILTSTONE @ 8560' = DARK GRAY, GRAY, TO BLACK; CRUMBLY TO CRUNCHY TENACITY; IRREGULAR, BLOCKY FOR PLANAR FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY GRADING TO GRITTY TEXTURE; SOME INTERBEDDED CARBONACEOUS MATERIAL; INTERBEDDED CALCITE SEEN IN SAMPLE; LAMINAE TO THICK STRUCTURE; GAS IS DRY.  
 SURVEY: 8656' MD, 88.93 INC 45.41 AZI  
 7744.34' TVD  
 SHALE @ 8700' = DARK GRAY TO NEAR BLACK; LIGHTER GRAY WHEN DRY; FIRM TO OCC SOFT AND MUSHY WHEN HYDRATED; MATTE TO SLI RESINOUS LUSTER; GRADING AND INTERBEDDED WITH SILTSTONE; PELLETAL SHALE/SILTSTONE HAS A DARKER ALMOST IRIDESCENCE UNDER BRIGHT LIGHT; SIMILAR IN APPEARANCE TO STATIC EFFECT ON A TELEVISION UNDER HIGHER MAGNIFICATION; THIN PLATY CUTTING



8800

8900

9000

9100

9200

9300

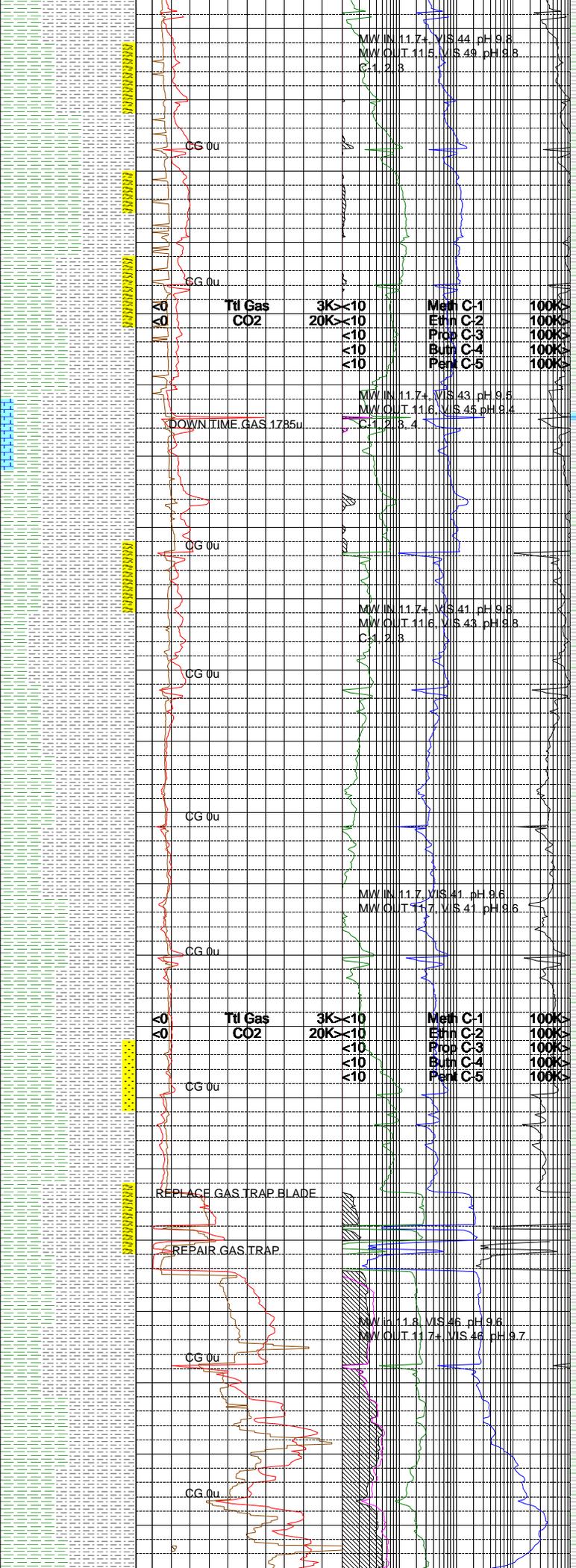
9400

9500

9600

9700

9800



HABIT: FISSIL; MODERATELY CALCAREOUS; COMMON SCATTERED WHITISH YELLOW FOSSIL SHELL FRAGMENTS; NO OIL INDICATORS; MOD ROP DEPENDANT DRILL GAS; NO CONNECTION GASSES.

SILTSTONE @ 8900' = MEDIUM TO DARK GRAY; FIRM TO OCC SLI HARD; SILTY TO SLI IRIDESCENT LUSTURE; SILTY TO SLI FINE ABRASIVE TEXTURE; CLAYEY; GRADING TO SHALE; THINLY BEDDED TO LAMINATED; FISSIL AND COMMON THIN PLATY TO OCC TABULAR CUTTING HABIT; MODERATELY TO OCC VERY CALCAREOUS; OCC FINE QUARTZ SAND GRAINS SCATTERED THRU SAMPLE; SCATTERED WHITISH YELLOW FOSSIL SHELL FRAGMENTS; NO OIL AND MODERATE DRILL GAS CONTINUES.

SILTSTONE @ 9030' = MEDIUM TO DARK GRAY; APPEARS TO BE BLACK; FIRM, CRUMBLY TO CRUNCHY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO PLATY CUTTINGS HABIT; DULL EARTHY LUSTER; SILTY GRADING TO GRITTY TEXTURE; LAMINATED BEDDING, THIN STRUCTURE; SOME YELLOW FOSSIL SHELL FRAGMENTS WITH MARL; SOME INTERBEDDED SHALE; MODERATE TO VERY CALCAREOUS; NO OIL AND MODERATE GAS.

SURVEY: 9129' MD, 90.03 INC 47.08 AZI 7752.59' TVD

SILTSTONE @ 9160' = DARK TO MEDIUM GRAY; FIRM, CRUMBLY TO CRUNCHY TENACITY; IRREGULAR TO CRUNCHY FRACTURE; LAMINATED BEDDING, THIN STRUCTURE; TRACE PYRITE SEEN IN SAMPLE; DULL EARTHY LUSTER; MASSIVE TO TABULAR CUTTINGS HABIT; GRADES FROM SMOOTH TO GRITTY TEXTURE; MODERATE TO VERY CALCAREOUS; NO OIL AND DRY GAS.

SURVEY: 9224' MD, 90.48 INC 47.51 AZI 7752.17' TVD

SHALE @ 9290' = DARK GRAY, GREENISH BLUE TO MEDIUM BLUISH GRAY; BRITTLE TO CRUMBLY TENACITY; IRREGULAR TO PLANAR FRACTURE; PLATY TO FLAKY CUTTINGS HABIT; DULL EARTHY LUSTER; SMOOTH GRADING TO GRITTY TEXTURE; LAMINAE TO THIN STRUCTURE; INTERBEDDED SILTSTONE; NO VISIBLE HYDROCARBON INDICATORS.

SURVEY: 9318' MD, 90.72 INC 47.43 AZI 7751.18' TVD

SILTSTONE @ 9410' = DARK GRAY, TO DARK BROWNISH GRAY; TOUGH, CRUNCHY TO CRUMBLY TENACITY; IRREGULAR TO BLOCKY FRACTURE; MASSIVE TO TABULAR CUTTINGS HABIT; DULL, EARTHY LUSTER; CLAYEY GRADING TO GRITTY TEXTURE; LAMINAE TO THIN STRUCTURE; THIN ARGILLACEOUS ZONES SEEN IN SAMPLE; MODERATE TO VERY CALCAREOUS.

SHALE @ 9550' = MEDIUM TO DARK GRAY TO BROWNISH GRAY WITH COMMON DARK BLACKISH SPECKS; DULL TO SLI IRIDESCENT LUSTER; CLAYEY TO SILTY TEXTURE; MOD TO VERY CALCAREOUS; MOD REACTIVE TO WATER AND EASILY HYDRATES AND BECOMES MUSHY; SCATTERED WHITE FOSSIL SHELL FRAGMENTS; INTERBEDDED WITH SILTSTONE; SOFT TO SLI FIRM; CRUMBLY; THIN PLATY CUTTINGS; FISSIL; NO OIL INDICATORS; MOD TO HIGH DRILL GAS; OBSERVED TO DEGAS AND BUBBLE WHEN WET ALONG POSSIBLE FRACTURE PLANES.

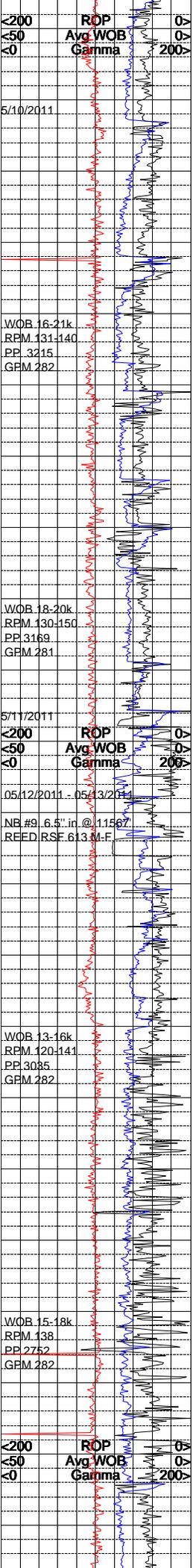
NOTE= GAS READINGS INCREASE DUE TO REPLACEMENT OF GAS TRAP BLADES;

NOTE= GAS READINGS ARE CONTINUING TO BE MOSTLY DRILL GAS AND ROP DEPENDENT; VERY MINOR CONNECTION GASSES ARE NOTED; BACKGROUND CIRCULATION GAS WITH NO NEW FORMATION @ SHAKERS ID 200 TO 250 UNITS.

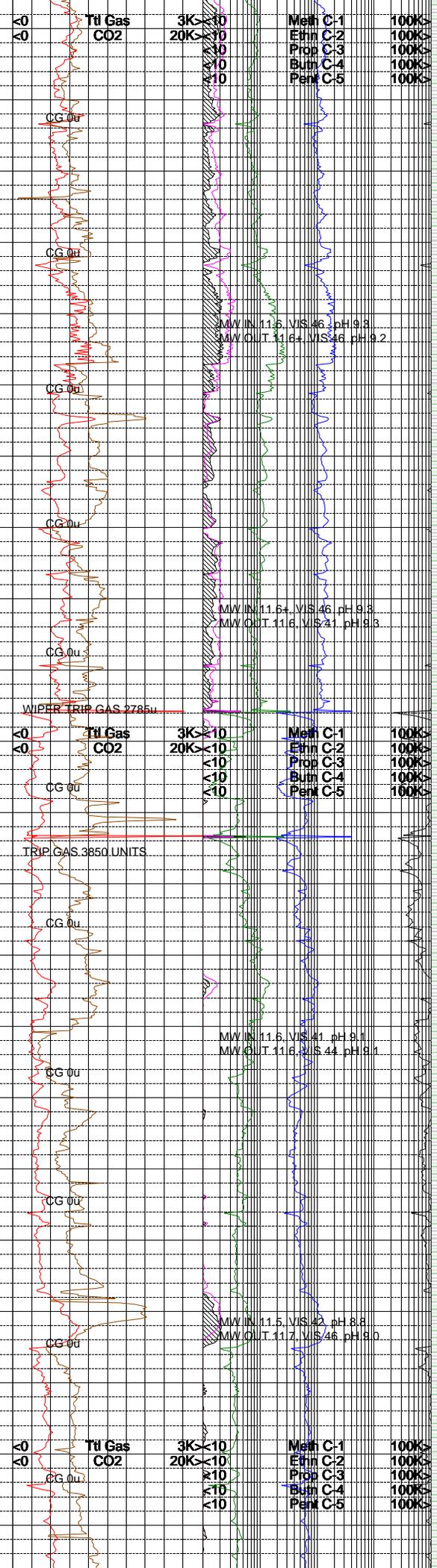
SILTSTONE @ 9800' = MEDIUM TO DARK GRAY TO BROWNISH GRAY FIRM TO OCC SLI HARD; SPARKLY TO SPOTTED APPEARANCE WITH LIGHT AND DARKER ZONES; CALCAREOUS; GRADING TO SHALE; SILTY TO FINE ABRASIVE TEXTURE; OCCASIONALLY VERY FINE SAND GRAINS GIVE A BUMPY APPEARANCE; NO OIL INDICATORS; MODERATE TO HIGH ROP DEPENDANT DRILL GASSES; VERY MINOR CONNECTION GASSES.

SURVEY: 9890' MD, 91.24 INC 47.36 AZI





11000  
11100  
11200  
11300  
11400  
11500  
11600  
11700  
11800  
11900  
12000



CLAYEY GRADING TO GRITTY TEXTURE; LAMINAE STRUCTURE; NO OIL INDICATORS; MODERATE TO HIGH DRILL GAS.

SILTSTONE @ 11100' = MEDIUM BROWNISH GRAY TO GRAY; FIRM TO OCC BRITTLE AND SLIGHT HARD; CRUMBLY TO CRUNCHY; BUMPY TO SLI IRIDESCENT APPEARANCE; MOD ARGILLACEOUS; CALCAREOUS; SMALL PLATY CUTTINGS HEAVILY REWORKED IN LATERAL SECTION; GRADING TO SOFTER SHALE AND OCC VERY FINE SAND GRAINS SEEN; NO OIL AND MODERATE DITCH GAS CONTINUES.

SHALE @ 11160' = MEDIUM GRAY TO OCC GRAY BLACK; DRIES TO A LIGHTER BROWNISH GRAY; SOFT TO SLI FIRM; EASILY HYDRATABLE AND MUSHY; PDC CORRELATED TO THIN PLATY CUTTING HABIT WHEN MORE COMPETENT; THINLY BEDDED AND FISSIL; INTERBEDDED WITH SILTSTONE; SCATTERED BLACK CARBON MATERIAL FLECKS; SMOOTH TO SLI SILTY TEXTURE; MODERATELY CALCAREOUS; OCC WHITISH YELLOW FOSSIL SHELL FRAGMENTS; NO OIL AND DITCH GAS IS HIGHLY ROP DEPENDENT.

SILTSTONE @ 11360' = MEDIUM GRAY TO DARK GRAY WITH BROWN HUES; FIRM; SILTY TO FINE ABRASIVE TEXTURE; BRITTLE AND SLI CRUNCHY; MOD CALCAREOUS; MOD CLAYEY AND CLAY WASHES OUT IN WATER; DULL TO OCC SPARKLY TO SLI IRIDESCENT LUSTER; PELLETAL SILTSTONE OBSERVED AS BUMPY APPEARANCE WITH DARK GRAY BLACK PELLETS IN LIGHTER GRAY MATRIX; SEEN TO DEGAS SLIGHTLY UNDER WATER; POSSIBLE SECONDARY FRACTURE POROSITY; NO OIL INDICATORS.

SURVEY: 11407' MD, 90.00 INC 48.85 AZI 7734.00' TVD

SHALE @ 11450' = MEDIUM GRAY TO DARK GRAY; TOUGH, CRUMBLY TO CRUNCHY TENACITY; IRREGULAR TO PLANAR FRACTURE; PLATY TO FLAKY CUTTINGS HABIT; DULL EARTHY LUSTER; CLAYEY GRADING TO GRITTY SILTSTONE TEXTURE; LAMINAE STRUCTURE; MODERATE TO HIGH REACTION TO DILUTE HCL, VERY CALCAREOUS; SOME THIN INTERBEDDED CARBONACEOUS MATERIAL; NO OIL; MODERATE GAS DEPENDENT ON ROP.

NOTE = POOH @ 11567' FOR A NEW BIT.

SILTSTONE = VERY DARK GRAY TO GRAY; DRIES SOMEWHAT LIGHTER; FIRM TO SLI HARD; CRUNCHY TO CRUMBLY; MODERATELY CALCAREOUS; DULL TO SPARKLY LUSTER; BUMPY PELLATAL APPEARANCE IN SOME CUTTINGS; GRADING TO MORE ARGILLACEOUS SHALE; HACKLY TO PLANAR FRACTURE; VERY THINLY BEDDED TO LAMINATED STRUCTURE; FISSIL; THIN PLATY TO MODERATELY REWORKED IRREGULAR CUTTING HABIT; OCC SEEN TO SLOWLY DEGAS IN WET SAMPLE TRAY; MODERATE TO HIGH ROP DEPENDENT DRILL GAS; GAS IS DRY WITH VERY LOW C-3 AND TRACE C-4 IN CHROMATOGRAPHY.

SHALE @ 11800' = MEDIUM TO DARK GRAY TO OCC BLACKISH IN NATURAL SUNLIGHT; FIRM TO OFF SOFT AND MUSHY; MOD SILTY OVERALL; OBSERVED TO BE SOLUBLE ON WATER WASHING; GENERALLY MODERATE CALCAREOUS; VERY THINLY BEDDED AND GRADING TO AND INTERBEDDED WITH SILTST; MODERATE TO OCC HIGH DRILL GAS; NO APPARENT CONNECTION GASSES; NO OIL INDICATORS.

NOTE = GASSES CONTINUE TO BE DRY AND DEPENDENT ON ROP AS TO MAGNITUDE. THERE ARE NO APPARENT CONNECTION GASSES.

SURVEY: 11887' MD, 91.75 INC 48.66 AZI 7729.00' TVD

SHALE @ 11940' = DARK GRAY, TO MEDIUM GREENISH GRAY; TOUGH, CRUNCHY TO CRUMBLY TENACITY; IRREGULAR TO PLANAR FRACTURE; PLATY TO FLAKY CUTTINGS HABIT; EARTHY, DULL TO WAXY LUSTER WHEN WET; CLAYEY GRADING TO GRITTY TEXTURE; LAMINAE TO THIN STRUCTURE; INTERBEDDED SILTSTONE; MODERATE TO HIGH REACTION TO DILUTE HCL, MODERATELY CALCAREOUS; NO OIL; DRY GAS.

SURVEY: 12078' MD, 91.82 INC 47.26 AZI 7722.85' TVD



